

Claims

1. A method of forming a ceramic material or body comprising the steps of:-
 - i) providing a water-containing mixture of raw materials
 - 5 ii) forming said mixture into a shape
 - iii) removing water from said shape
 - iv) firing said shape at a temperature sufficient to effect sintering and/or reaction of the raw materials and thereby form a ceramic material or body

in which the raw materials include a hygroscopic polymeric material capable of retaining water in the mixture over a range of temperatures above the boiling point of water.
2. A method as claimed in Claim 1, in which the hygroscopic polymeric material is present in the mixture in amounts less than 5% by weight of the dry ingredients.
3. A method as claimed in Claim 2, in which the hygroscopic polymeric material is present in the mixture in amounts less than 1% by weight of the dry ingredients.
4. A method as claimed in any one of Claims 1 to 3, in which the hygroscopic polymeric material has an absorbency of more than 5 grams of water per gram of material.
5. A method as claimed in Claim 4, in which the hygroscopic polymeric material has an absorbency of more than 10 grams of water per gram of material.
6. A method as claimed in Claim 5, in which the hygroscopic polymeric material has an absorbency of more than 100 grams of water per gram of material.
7. A method as claimed in Claim 6, in which the hygroscopic polymeric material has an absorbency of more than 200 grams of water per gram of material
8. A method as claimed in any one of Claims 1 to 5, in which the hygroscopic polymeric material is a polyacrylate.
9. A method as claimed in any one of Claims 1 to 8, in which the hygroscopic polymeric material comprises a fine powder with 75% by weight or more of a size less than 150 μm .

10. A method as claimed in any one of Claims 1 to 9, in which the raw materials include a carbonisable binder.
11. A method as claimed in Claim 10, in which the carbonisable binder is a sugar-based binder.
- 5 12. A method as claimed in Claim 11, in which the sugar-based binder comprises a mixture of a syrup and a starch.
13. A method as claimed in any one of Claims 1 to 12, in which the raw materials include silicon carbide and graphite.
14. A method as claimed in Claim 13, in which the ceramic body is a crucible.
- 10 15. Use as a component of a raw material mixture used in the production of a ceramic, of a hygroscopic polymeric material to retain water in the mixture over a range of temperatures above the boiling point of water.
16. A raw material mixture, used in the production of a ceramic, including a hygroscopic polymeric material capable of retaining water in the mixture at a range of temperatures above the boiling point of water.
- 15 17. A raw material mixture as claimed in Claim 16, in which the hygroscopic polymeric material is present in the mixture in amounts less than 5% by weight of the dry ingredients.
18. A raw material mixture as claimed in Claim 17, in which the hygroscopic polymeric material is present in the mixture in amounts less than 1% by weight of the dry ingredients.
- 20 19. A raw material mixture as claimed in any one of Claims 16 to 18, in which the hygroscopic polymeric material has an absorbency of more than 5 grams of water per gram of material.
- 25 20. A raw material mixture as claimed in Claim 19, in which the hygroscopic polymeric material has an absorbency of more than 10 grams of water per gram of material.
21. A raw material mixture as claimed in Claim 20, in which the hygroscopic polymeric material has an absorbency of more than 100 grams of water per gram of material.
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22. A raw material mixture as claimed in Claim 21, in which the hygroscopic polymeric material has an absorbency of more than 200 grams of water per gram of material.
23. A raw material mixture as claimed in any one of Claims 16 to 22, in which the
5 hygroscopic polymeric material is a polyacrylate.
24. A raw material mixture as claimed in any one of Claims 16 to 23, in which the hygroscopic polymeric material comprises a fine powder with 75% by weight or more of a size less than 150 μm .
25. A raw material mixture as claimed in any one of Claims 16 to 24, including a
10 carbonisable binder.
26. A raw material mixture as claimed in Claim 25, in which the carbonisable binder is a sugar-based binder.
27. A raw material mixture as claimed in Claim 26, in which the sugar-based binder comprises a mixture of a syrup and a starch.
- 15 28. A raw material mixture as claimed in any one of Claims 16 to 27, including silicon carbide and graphite.
29. A binder for a ceramic, comprising one or more reactive components to provide a fired bond in the ceramic, and a hygroscopic polymeric material.
30. A binder, as claimed in Claim 29, in which the hygroscopic polymeric material has
20 an absorbency of more than 5 grams of water per gram of material.
31. A binder, as claimed in Claim 30, in which the hygroscopic polymeric material has an absorbency of more than 10 grams of water per gram of material.
32. A binder, as claimed in Claim 31, in which the hygroscopic polymeric material has an absorbency of more than 100 grams of water per gram of material.
- 25 33. A binder, as claimed in Claim 32, in which the hygroscopic polymeric material has an absorbency of more than 200 grams of water per gram of material.
34. A binder, as claimed in any one of Claims 29 to 33, in which the hygroscopic polymeric material comprises a polyacrylate.
35. A binder, as claimed in any one of Claims 29 to 34, in which the reactive
30 components include a carbonisable material.
36. A binder, as claimed in Claim 35, in which the carbonisable binder is a sugar-based binder.

37. A binder, as claimed in Claim 36, in which the sugar-based binder comprises a mixture of a sugar syrup and a starch.

38. A binder, as claimed in Claim 37, in which the sugar syrup has a solids content of greater than 70%.

5 39. A binder, as claimed in Claim 38, in which the sugar syrup has a carbon content as assessed by TGA of above 10% by weight.

40. A binder, as claimed in Claim 39, in which the sugar syrup has a carbon content as assessed by TGA of above 15% by weight.

10 41. A binder, as claimed in any one of Claims 35 to 40, providing a carbon yield when carbonised of greater than 20%.

42. A method of forming a ceramic article by the steps of forming a green body and firing the green body at a temperature sufficient to carbonise a carbonisable binder in the green body, in which the carbonisable binder comprises a sugar syrup and a carbonaceous additive increasing the carbon yield of the binder upon firing.

15 43. A method as claimed in Claim 42, in which the carbonaceous additive is a starch.

44. A method as claimed in any one of Claims 42 to 43, in which the carbonisable binder has a carbon yield of greater than 20%.

45. A method as claimed in any one of Claims 42 to 44, in which the sugar syrup has a solids content of greater than 70%.

20 46. A method as claimed in any one of Claims 42 to 45, in which the ash content of the sugar syrup is less than 5%.

47. A method as claimed in Claim 46, in which the ash content of the sugar syrup is less than 1%.